

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>20021140</b>	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416																									
International application No. <b>PCT/FI2003/000538</b>	International filing date (day/month/year) <b>03.07.2003</b>	Priority date (day/month/year)																								
International Patent Classification (IPC) or national classification and IPC <b>B22D 27/04, C22F 1/00, C30B 21/00</b>																										
<b>Applicant</b> <b>Outokumpu Oyj et al</b>																										
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> <p>4. This report contains indications relating to the following items:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 15%; text-align: center;">Box No. I</td> <td style="width: 70%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;">Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;">Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;">Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;">Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;">Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;">Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;">Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>			<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input checked="" type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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Date of submission of the demand <b>24.01.2005</b>	Date of completion of this report <b>13.10.2005</b>
Name and mailing address of the IPEA/SE <b>Patent - och registreringsverket Box 5055 S-102 42 STOCKHOLM</b>	Authorized officer <b>Nils Engnell/MP Telephone No. +46 8 782 25 00</b>
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## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI2003/000538

## Box No. I Basis of the report

1. With regard to the language, this report is based on:

the international application in the language in which it was filed

a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of:

international search (Rules 12.3(a) and 23.1(b))

publication of the international application (Rule 12.4(a))

international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

the international application as originally filed/furnished

the description:

pages \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

the claims:

pages \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ as amended (together with any statement) under Article 19

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

the drawings:

pages \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3.  The amendments have resulted in the cancellation of:

the description, pages \_\_\_\_\_

the claims, Nos. \_\_\_\_\_

the drawings, sheets/figs \_\_\_\_\_

the sequence listing (*specify*): \_\_\_\_\_

any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages \_\_\_\_\_

the claims, Nos. \_\_\_\_\_

the drawings, sheets/figs \_\_\_\_\_

the sequence listing (*specify*): \_\_\_\_\_

any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

International application No.

PCT/FI2003/000538

**Box No. II Priority**

1.  This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:
  - copy of the earlier application whose priority has been claimed (Rule 66.7(a)).
  - translation of the earlier application whose priority has been claimed (Rule 66.7(b)).
2.  This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rule 64.1). Thus for the purposes of this report, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

**Box No. V** **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

## 1. Statement

Novelty (N)	Claims	<u>1-12</u>	YES
	Claims	_____	NO
Inventive step (IS)	Claims	_____	YES
	Claims	<u>1-12</u>	NO
Industrial applicability (IA)	Claims	<u>1-12</u>	YES
	Claims	_____	NO

## 2. Citations and explanations (Rule 70.7)

**Reference is made to the following documents:**

D1: Scripta Materialia, Vol. 48, May 2003, G. Mogylmyy et. al.: "Crystal structure and twinning in martensite of Ni<sub>1.96</sub>Mn<sub>1.18</sub>Ga<sub>0.86</sub> magnetic shape memory alloy", pp. 1427-1432.

D2: Journal of Alloys and Compounds, Vol. 312, 2000, D.L. Schlagel Et.al: "Chemical segregation during bulk crystal preparation of Ni-Mn-Ga ferromagnetic shape memory alloys", pp. 77-85.

D3: Scripta Materialia, Vol. 36, 1997, K. Ullakko et. al.: "Magnetically controlled shape memory effect in Ni<sub>2</sub>MnGa intermetallics", pp.1133-1138.

D4: EP 866 142 A1

D5: Ullman's Encyclopedia of Industrial Chemistry, 5th Edition, 1987, Vol. A8, pp. 123-124.

**Discussion.**

The invention according to claim 1 refers to a method of producing a magnetically active shape memory Ni-Mn-Ga-alloy. A homogenous melt is cast and directionally solidified.

.../...

## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

D1 and D2 are scientific reports on some properties of the material in question; in present claim 1 only a "metal alloy containing nickel, manganese and gallium" is specified. According to D1 and D2, single crystal specimens are produced by laboratory means, such as the Bridgman method. However, according to D5, the Bridgman method is to be considered to be a method of manufacturing directionally solidified objects. The Bridgman method can be used in industrial production of objects, see D5. Consequently, the present method merely defined as "directional solidification" lacks novelty.

The further feature in claim 1 that a temperature range below the liquidus temperature during solidification is stated is not considered to involve an inventive step as being within the skill of a professional in the technical field to find out.

The features disclosed in claims 2-12 are obvious to a person skilled in the art.

D3 and D4 were cited to show the general state of the art not considered to be of particular relevance. D5 was cited to disclose the essential features of the Bridgman method.